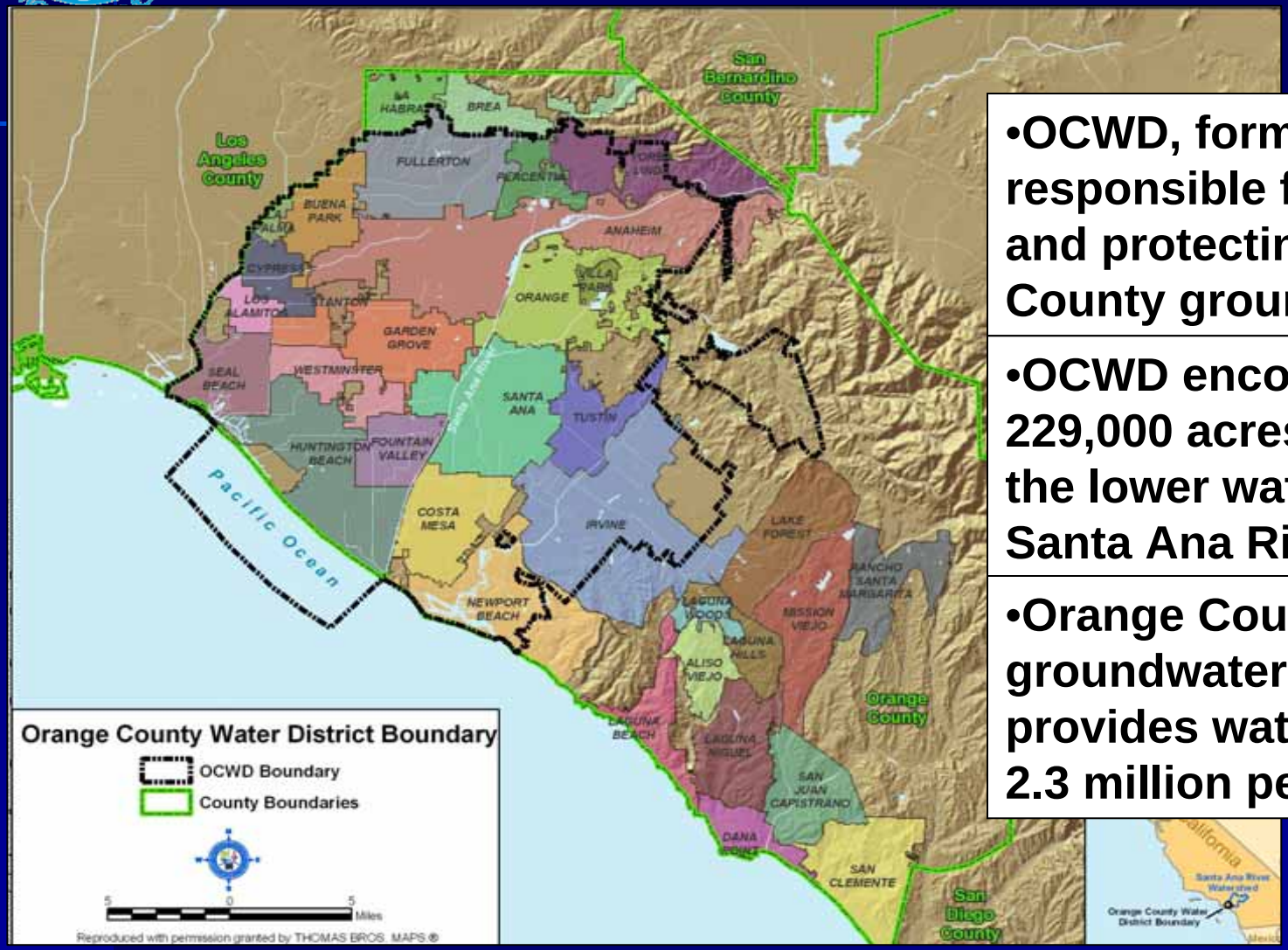
Groundwater Replenishment System
SCAG

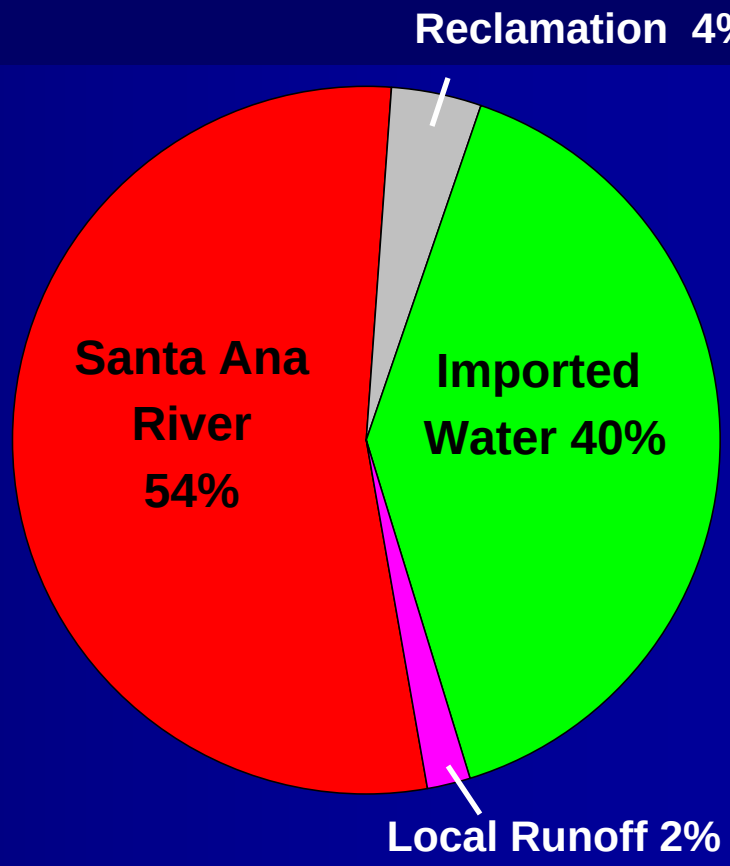
February 28, 2008

Orange County Water District

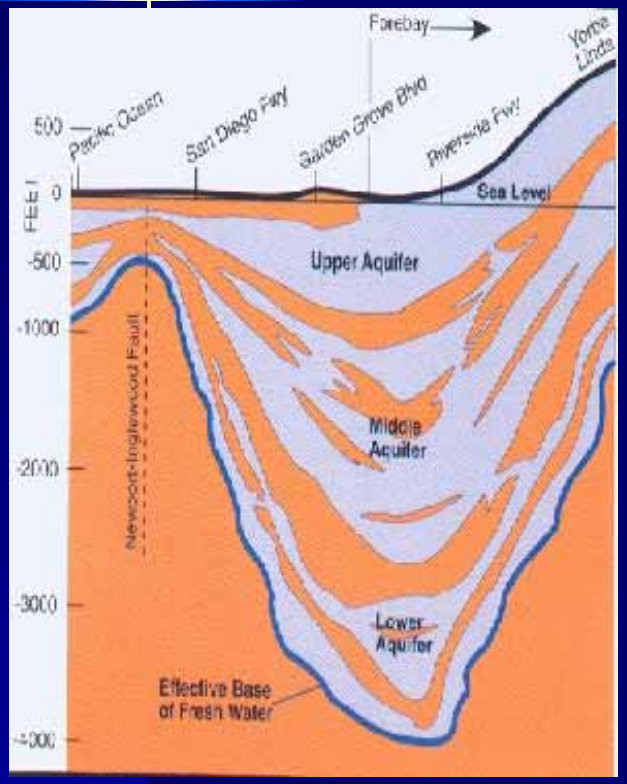


- **OCWD, formed in 1933, is responsible for managing and protecting the Orange County groundwater basin**
- **OCWD encompasses 229,000 acres (925 km^2) in the lower watershed of the Santa Ana River (SAR)**
- **Orange County groundwater basin provides water for over 2.3 million people**

OCWD Water Supply



Sources of Water for Orange County



- *Groundwater* (OCWD) provides 74% of the water used in North and Central Orange County
  - Groundwater is pumped from wells to producers (Cities and Agencies)
  - Groundwater basin is recharged by the Santa Ana River, rain water, imported water and recycled water

Sources of Water for Orange County

- *Imported Water* (Metropolitan Water District) is water from the Colorado River and Northern California
  - 26% of the water used in North and Central Orange County
  - Nearly 100% of the water used in South Orange County

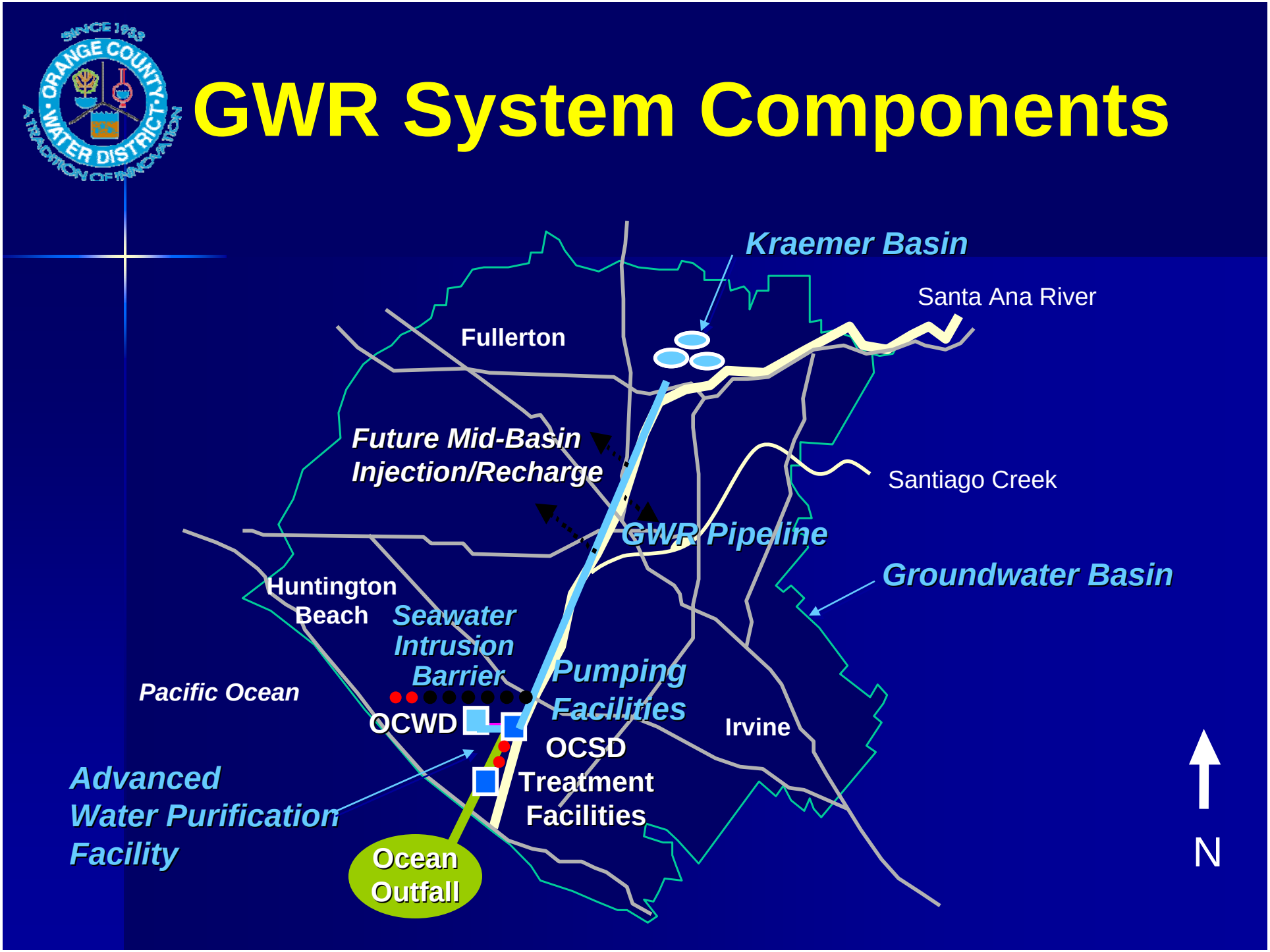
Operational Recharge Facilities

Prado Dam

Groundwater Replenishment System

Santa Ana River Facilities

GWR System Components

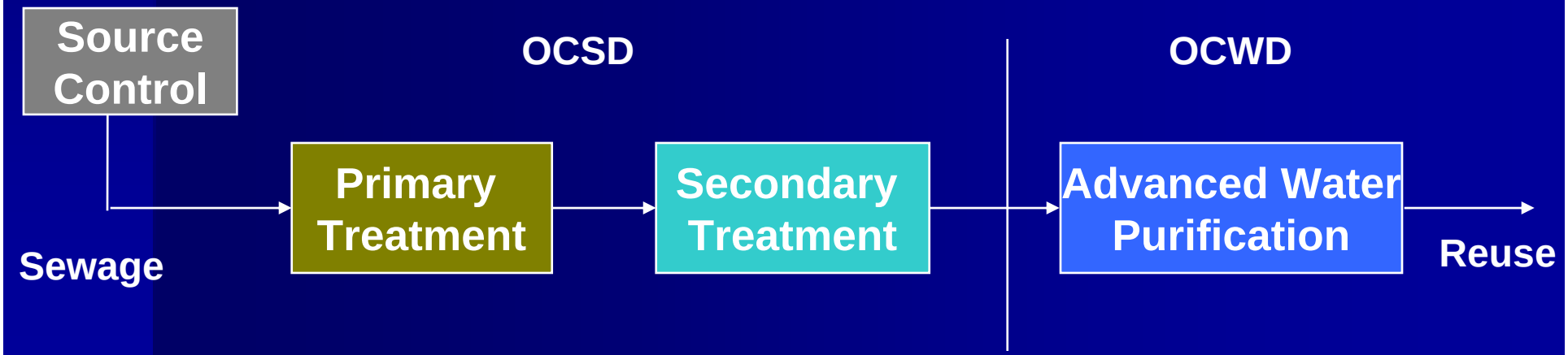


Agency Responsibilities

OCSD - Wastewater Collection, Treatment and Disposal

OCWD - Manage and Protect the Orange County Groundwater Basin

First Partnership in 1972 for Wastewater Reclamation



GWR System Advanced Water Purification

Microfiltration (MF)

Reverse Osmosis (RO)

Ultraviolet Light with H_2O_2

OCSD Secondary Effluent

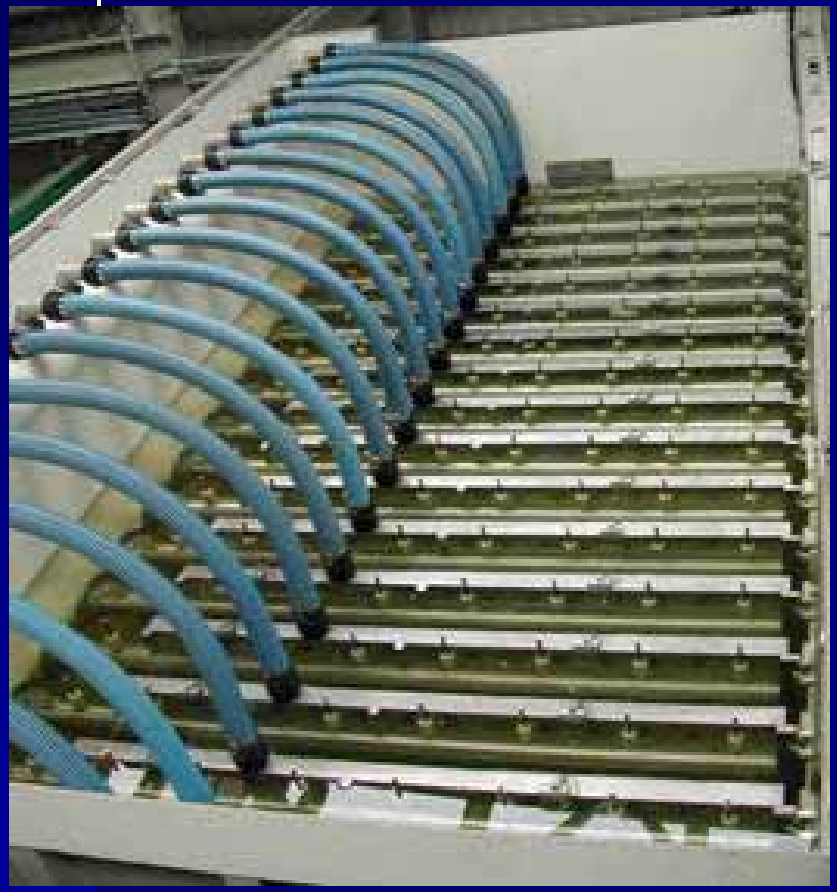
Barrier

Recharge Basins

Backwash OCSD Plant 1

Brine OCSD Outfall

Microfiltration System



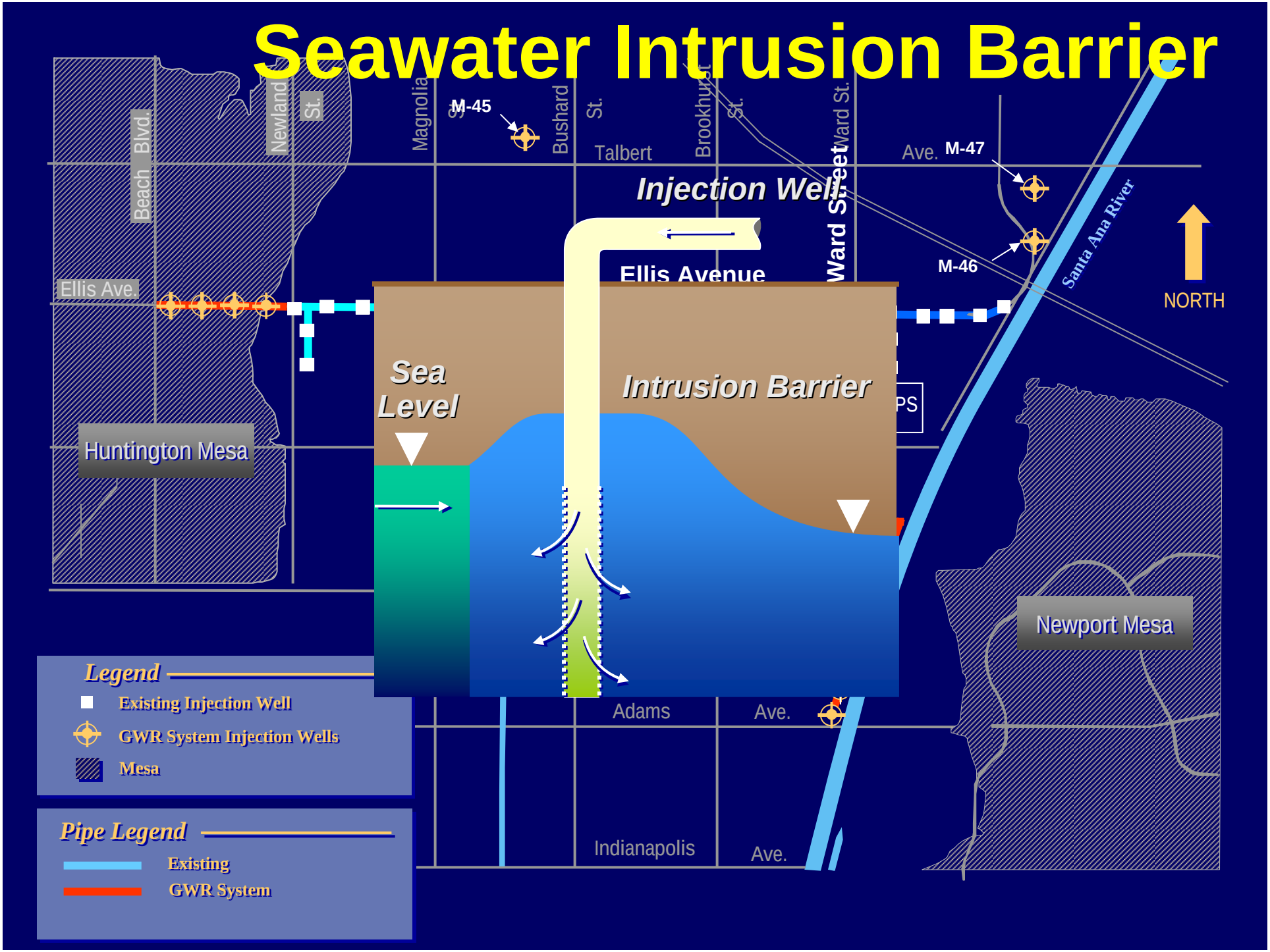
- 86 MGD US Filter CMF-S Microfiltration System
- Removes bacteria, protozoa, and suspended solids
- 0.2 micron pore size
- In basin submersible system

Reverse Osmosis System

- 70 MGD Reverse Osmosis System
- Hydranautics ESPA-2 Membranes
- Recovery Rate: 85%
- Removes salts, viruses, organics and pharmaceuticals
- Pressure range: 150 – 200 psi

Ultraviolet/Advanced Oxidation System

- 70 MGD Trojan UVPhox System
- Low Pressure – High Output lamp system
- Removes trace organics
- Uses Hydrogen Peroxide to form an Advanced Oxidation Process


Seawater Intrusion Barrier
Beach Blvd.
Newland St.
Magnolia St.
Bushard St.
Brookhurst St.
Ward St.
Talbert
Ave.
M-45
M-46
M-47
Injection Well
Ellis Avenue
Ellis Ave.
Sea Level
Intrusion Barrier
Huntington Mesa
Newport Mesa
Santa Ana River
NORTH
Adams
Ave.
Indianapolis
Ave.
Legend
Existing Injection Well
GWR System Injection Wells
Mesa
Pipe Legend
Existing
GWR System

GWR System Pipeline

- 13.5 mile pipeline, 60-78 in diameter
- Sized for ultimate flow
- Future mid-basin injection
- Located along west Santa Ana River levee

Estimated Capital Cost

Construction Contracts	Escalated Cost ($M)
Treatment Facilities	298.7
Equipment Engineering	0.8
Trailers	0.8
Phase 1 GWR System & Site Power	19.8
GWR Pipeline*	63.2
Barrier Facilities	17.1
Integrated Information System, Wells, Workshops & Insurance	15.2
ELA & Contingency	$65.3
Total	$480.9

***3 contracts**

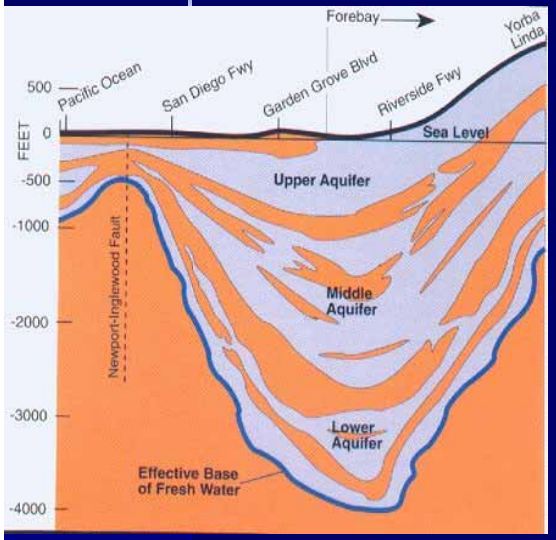
Estimated Annual O&M Cost

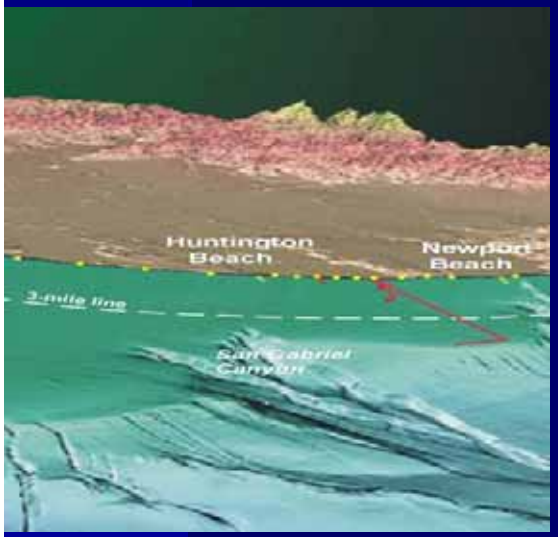
Item	$ Million per Year
Power	14.5
Contract Maintenance	0.4
Chemicals	5.3
Plant Refurbishment	1.2
Membrane Replacement	2.8
UV Lamp Replacement	0.3
Compliance Monitoring	1.5
O&M Staff	3.6
Sub - Total	29.6
Metropolitan Water District Subsidy	(3.8)
Total	25.8

Federal, State, and Local Funding

Grants	$ Million
■ Environmental Protection Agency	0.5
■ United States Bureau of Reclamation	20.0
■ State Water Resources Control Board	5.0
■ State Water Resources Control Board (Prop.13)	37.0
■ Department of Water Resources (Prop. 13)	30.0
Total Grants	$92.5
Loans	
■ State Revolving Fund Loans	$145.0

GWR System Benefits





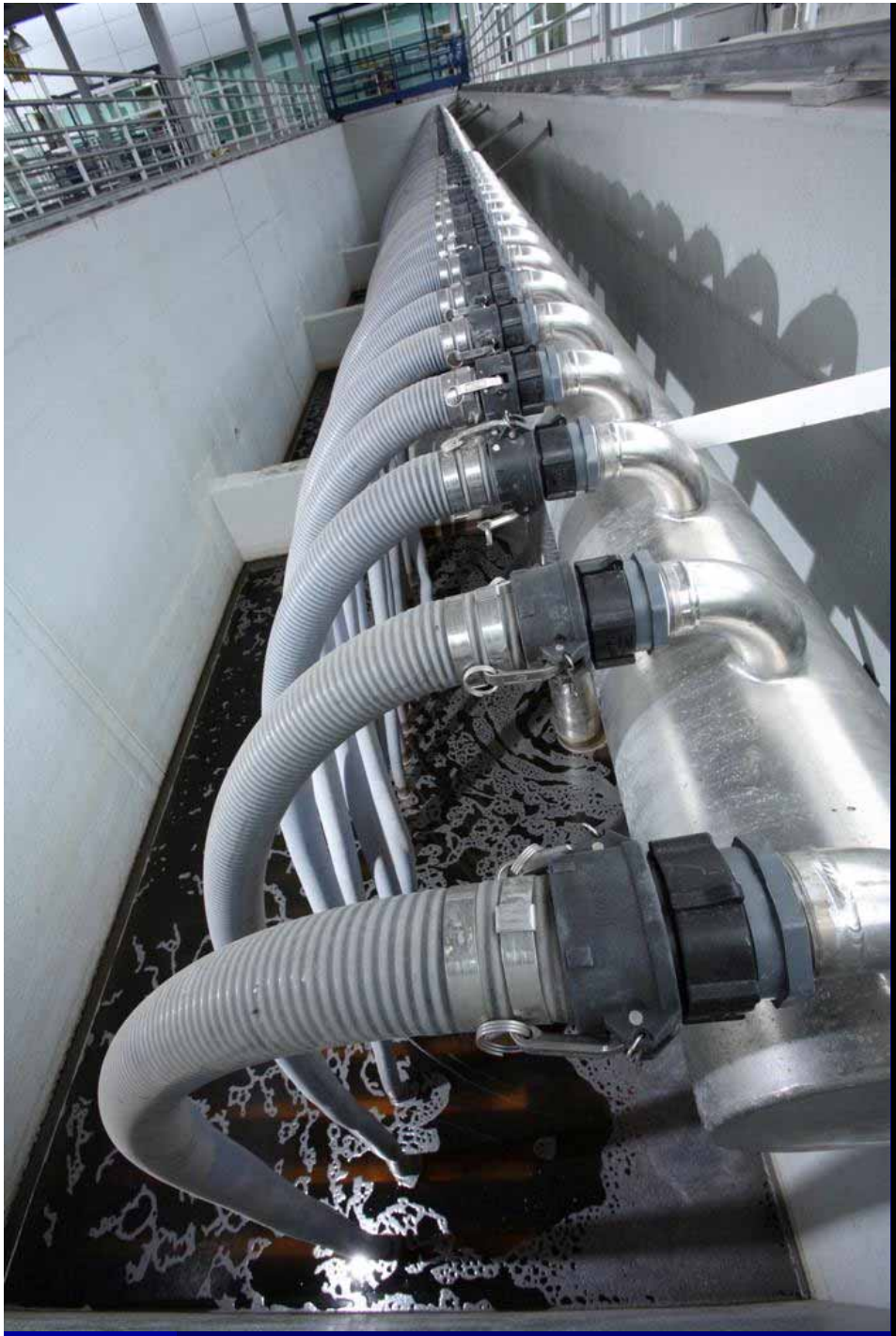
1. Maximize benefits from groundwater basin
2. Build expanded seawater barrier
3. Help with future drought reliability
4. Delays outfall pipe into ocean
5. Reuse valuable resource
6. Saves ½ energy over imported water
7. Improve quality of water in basin
8. Diversifies water supply in arid region
9. Helps with overall reliability for Southern California with imported water cutbacks in future
10. Helps with looming global water crisis – replicated worldwide

Importance of Public Perception

- Active, Honest, Open Community Outreach
- High Level of Treatment
- 30 Year History of Water Recycling
- Education Changes Reactions
- Visit website: www.gwrsystem.com

Current Production

- SW Intrusion Barrier – Jan 10
  - 20 MGD
- Recharge Basins – Jan 18
  - 30 MGD for 18 hours a day

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REVERSE OSMOSIS


ULTRAVIOLET LIGHT
TROJAN UVPHOX


LIME POST TREATMENT